WHAT IS CLAIMED IS:

1. A method for downloading streaming data comprising the steps of:

(a) establishing connections with a plurality of nodes;

5   (b) sending a request for sub blocks of streaming data to the plurality of nodes where connection is established to download the sub blocks;

(c) monitoring download state of the established connections; and

(d) redistributing sub blocks to be downloaded from some of the nodes where connection is established according to the monitoring result;

10   wherein, the step (b) to step (d) are repeated for downloading sub blocks included in next block when all sub blocks included in a block are downloaded.

2. The method of claim 1, further comprising the step of determining sub blocks to download from each of the nodes where connection is established.

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3. The method of claim 1, wherein the step (c) comprises the step of monitoring if there exists a connection where sub block download is completed.

4. The method of claim 2, wherein the sub blocks to be downloaded from

20   each of the nodes are determined by calculating connection state valuation index.

5. The method of claim 4, wherein the connection state valuation index is calculated using information selected from group consisting of round-trip time with each of the nodes and average download speed from each of the nodes.

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6. The method of claim 3, wherein the step (d) comprises the step of redistributing sub blocks between a connection where sub block download is completed and some of the connections where sub block download is not completed when a connection where sub block download is completed exists.

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7. The method of claim 6, wherein the step (d) comprises the step of redistributing sub blocks between a connection where sub block download is completed and a connection of which download rate is the lowest among connections where sub block download is not completed.

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8. The method of claim 7, the step for redistributing sub blocks between a connection where sub block download is completed and a connection of which the download rate is the lowest comprises the steps of:

determining download speed of the connection where the sub block

15   download is completed and the connection of which the download rate is the lowest;

determining the number of remaining sub blocks to download in the connection of which the download rate is the lowest;

determining if redistribution of sub blocks is necessary;

20   redistributing the remaining sub blocks between the connection where sub block download is completed and the connection of which the download rate is the lowest according to rate of the download speed if sub block redistribution is necessary.

25   9. The method of claim 1, further comprising the step of storing

information of nodes with which the connection establishment failed in a black list queue.

10. The method of claim 2, further comprising the step of receiving node

5   state information, wherein the sub blocks to be downloaded from each of the nodes are determined using the node state information.

11. The method of claim 2, wherein sub blocks to be downloaded from each of the nodes are determined by state information of nodes in initial state of

10   download, after determination of download speed from each of the nodes, sub blocks to be downloaded from each of the nodes are determined using connection state valuation index which is calculated using information selected from group consisting of round-trip time with each of the nodes and average download speed from each of the nodes.

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12. The method of claim 10, wherein the connection establishment with the plurality of nodes are performed using state information of the nodes in step (a).

13. The method of claim 1, further comprising the step of determining

20   download error using checksum value of downloaded sub blocks.

14. The method of claim 1, further comprising the step of sending a request for sub blocks to corresponding nodes by the redistribution result to download redistributed sub blocks after redistribution of sub blocks.

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15. The method of claim 1, further comprising the step of downloading streaming data by connecting to a singular server if sub block download from the plurality of the nodes fails.

5   16. The method of claim 1, further comprising the steps of:

monitoring state information of nodes which are not transmitting data among nodes where connection is established;

redistributing sub blocks to be downloaded between some of the nodes which are transmitting data and some of the nodes which are not transmitting data.

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17. A communication agent program installed in a plurality user clients in the system where a connection control server and the plurality of user clients are connected through network, comprising:

an agent manager module for providing information of contents stored in a

15   user client and identification information of the user client to the connection control server and transmitting contents request information to the connection control server when a user requests contents;

a node information manager module for receiving and storing list information of nodes that store requested contents;

20   a connection control module for establishing connections with a plurality of nodes using the list information of nodes, and determining sub blocks to download from each of the nodes where connection is established to request sub blocks, and redistributing sub blocks to download from some of the connected nodes by monitoring download state while downloading sub blocks;

25   a sub block manager module for determining if all sub blocks included in a

block are downloaded and requesting sub blocks included in a next block to download sub blocks included in the next block when all sub blocks included in a block is downloaded.

5   18. The program of claim 17, wherein the connection control module redistributes sub blocks between a connection where sub block download is completed and some of the connections where sub block download is not completed.

10   19. The program of claim 18,

the communication agent module comprises,

a connection establishment module for establishing connections with nodes included in the node list.

a connection state determining module for determining connection state

15   with nodes where connection is established;

a sub block distribution module for distributing sub blocks to be downloaded from nodes where connection is established using the connection state information;

a download state monitoring module for requesting redistribution of sub

20   blocks between a connection where sub block download is completed and a connection of which the download rate is the lowest to the sub block distribution module when there exists a node which completed requested sub block transmission;

wherein the sub block distribution module redistributes sub blocks to be

25   downloaded between the connection where sub block download is completed and

the connection of which the download rate is the lowest according to the download speed in response to the request for sub block redistribution by the download state monitoring module.

5   20. The program of claim 19, wherein connection state determining module determines connection state using information selected from group consisting of round-trip time with each of the nodes and average download speed from each of the nodes.

10   21. The program of claim 19, wherein the connection state determining module determines connection state by receiving node state information from the connection control server.

22. The program of claim 19, wherein the connection establishment module

15   establishes connections using node state information provided from the connection control server, if connection establishment fails, the connection establishment module establishes connection with other nodes using the node state information.

23. The program of claim 19, the connection establishment module stores

20   information of nodes with which connection establishment failed in a black list queue when connection establishment fails.

24. The program of claim 17, the sub block manager module determines download error using checksum value of sub blocks.

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25. The program of claim 17, further comprising a cache manager module for storing the downloaded streaming data in scrambled state and managing the stored data.

5   26. The program of claim 25, further comprising a block manager module for providing block data to the cache manager module or to a player which plays streaming data when all sub blocks included in a block are downloaded.

27. The program of claim 17, further comprising a reservation manager

10   module for transmitting reservation request information to the connection control server and managing reserved contents information.

28. The program of claim 17, wherein the connection control module monitors state of nodes which are not transmitting data among nodes where

15   connection is established and redistributes sub blocks between some of the nodes which are not transmitting data and some of the nodes which are transmitting data according to the monitoring result.

29. A communication agent program installed in user clients downloading

20   streaming data from system including a plurality of contents servers and at least a connection control server, comprising:

a data request module for sending a request for transmission of data to the connection control server;

a node information manager module for receiving and storing list of

25   contents servers from which the requested data are to be downloaded;

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a connection control module for establishing connections with a plurality of contents servers included in the contents server list, requesting sub blocks of streaming data to download from the contents servers where connection is established, and redistributing sub blocks to download in some of the contents

5   servers where connection is established by monitoring download state while downloading sub blocks from connected contents servers; and

a sub block manager module for determining if all sub blocks included in a block are downloaded and requesting sub blocks included in a next block to download sub blocks of the next block when all sub blocks included in a block are

10   downloaded.

30. The program of claim 29, wherein the connection control module redistributes sub blocks between a connection where sub block download is completed and some of the connections where sub block download is not

15   completed.

31. The program of claim 30, wherein the connection control module comprises,

a connection establishment module for establishing connections with

20   contents servers included in the contents server list;

a connection state determining module for determining connection state of connected contents servers;

a sub block distribution module for distributing sub blocks to be downloaded from each of the connected contents servers using the connection state

25   information; and

a download state monitoring module for requesting redistribution of sub blocks between a connection where sub block download is completed and a connection of which the download rate is the lowest, when there exists a connection where sub block download is completed;

5   wherein the sub block distribution module redistributes sub blocks according to download speed of the connection where sub block download is completed and the connection of which the download rate is the lowest in response to the request of the download state monitoring module.

10   32. The program of claim 31, wherein the connection state determining module determines connection state using contents server state information provided from the connection control server.

         33. A connection control server connected with a plurality of user clients
15   through network for controlling connection between the user clients in order for a user client to download streaming data by connecting other user clients, comprising:

         a mesh manager module for receiving information of contents stored in the connected plurality of user clients and address information of the connected plurality of user clients, and providing information of nodes that store requested
20   contents to a user client which requested contents; and

         a mesh information database for storing information of contents stored in each of the user clients and address information of each of the user clients;

         wherein a communication agent program is installed in the plurality of user clients, the communication agent program controls user clients to establish
25   connections with a plurality of nodes using the node information, and to send a

request for sub blocks of streaming data to download to the connected nodes, and to redistribute sub blocks to download by monitoring download state of each of the connected nodes.

5   34. The server of claim 33, further comprising an authentication module for authenticating users and processing billing information.

35. The server of claim 33, further comprising a user database for storing information of registered users and a meta information database for storing meta

10   information of streaming data.

36. The server of claim 33, wherein the mesh manager module receives state information of each of the nodes and provides the state information with the node information.

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37. A connection control server connected with a plurality of user clients and a plurality of contents servers through network for controlling connection between the user clients and the contents servers in order for a user client to download streaming data by connecting at least two contents servers, comprising:

20   a server state determining module for receiving state information from the connected plurality of contents servers and determining state of each of the contents servers;

a server list providing module for providing list information of servers to transmit streaming data of requested contents when receiving contents request

25   information from a user client;

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wherein a communication agent program is installed in the user clients, the communication agent program controls the user clients to establish connections with at least two contents servers using the server list information, and to determine sub blocks of streaming data to download from each of the connected contents servers to request sub blocks, and to redistribute sub blocks to download by monitoring download state of sub blocks from each of the connected nodes.

38. The server of claim 37, wherein the state information provided from the contents servers is selected form group consisting of bandwidth information, CPU usage information, memory usage information, the number of connected users, and file I/O information.